Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



₩ MAY 3 1 1929 ★

U. S. Department of Agriculture

U. S. Department of Agriculture, Forest Service

FOREST PRODUCTS LABORATORY

In cooperation with the University of Wisconsin

MADISON, WISCONSIN

LETHODS OF THE FOREST PRODUCTS LABORATORY FOR THE ANALYSIS OF CRUDE PYROLIGNEOUS ACID

NOT FOR PUBLICATION



METHODS OF THE FOREST PRODUCTS LABORATORY FOR THE ANALYSIS OF CRUDE PYROLIGHBOUS ACID

Total acid

Place 5 or 6 glass beads or porcelain chips in a 200 or 300 cc. Jens or Pyrex distilling flask fitted with a two-hole rubber stopper. Weigh flask and beads without stopper. In one hole of the rubber stopper put a 100 cc. dropping funnel and in the other hole a 250°C, thermometer adjusted so that it touches the bottom of the flask. Pipette 100 cc. of the crude pyroligneous acid into the dropping funnel and place flask in a sand bath. The temperature of the sand bath should not exceed 225°C. The crude acid is distilled by dropping it into the flask, at a rate just enough faster than the rate of distillation to prevent the temperature as shown by the thermometer in the flask rising above 140°C. When all of the crude acid has been added place 50 ec. of distilled water in the dropping funnel and as soon as the thermometer in the flask reads 140°C. begin adding the water at the same rate used for the acid. The distillation is complete when all of the water has been added and the thermometer reads 150°C. Remove the

A THE RESIDENCE OF THE PARTY OF

No. 2 - 4

A CONTRACTOR OF THE PARTY OF THE PARTY. I AN ANTITY MAKE THE PARTY OF T of the state of th A CONTRACT OF THE PARTY OF THE The second of th and the second of the second second the second second the A STATE OF A STATE OF THE PROPERTY OF THE PARTY OF THE PA - NAME AND ADDRESS OF THE PARTY many of the many has been said provided by send WHEN I REAL PROPERTY OF STATE OF STREET, STREE formers or collectionally to some off and subset does not seed THE RESIDENCE OF THE PERSON NAMED IN COLUMN 2 IN COLUM the state of the s sulpring and at author sulfillulation, and in male dealers NAMED AND POST OFFICE ADDRESS OF THE PARTY OF THE PARTY. THE RESIDENCE THE PARTY OF THE THE RESIDENCE OF STREET OF THE STREET OF THE STREET THE RESERVE AND ADDRESS OF THE PARTY OF THE

stopper at once and wipe the bulb of the thermometer on the incide of the neck of the flask to remove adhering tar. Remove flask from sand bath, wipe clean, let cool and weigh. The gain in weight of the flask is the grams of dissolved tar per 100 cc. of crude acid. Make up distillate to 250 cc.. mix thoroughly and titrate a 50 cc. portion with normal sodium hydroxide, using phenolphthalein as indicator. The titration should be made cold with 6 or 7 drops of indicator. The end point is not very sharp and usually goes through a reddishorange stage to a permanent red. The end point should be carried to the first permanent red; record as total acid. titration should be made as soon as possible after distillation and must be made the same day as the distillation since there is usually considerable exidation and darkening of the tarfree distillate, even on standing over night in a well stoppered flask, which makes the determination of the end point difficult.

Acetic acid

Add an excess (25 grams) of finely powdered mercuric oxide to 50 cc. of the distillate obtained in total acid determination. The mixture is made up to about 100 cc., well stirred and placed on a steam bath. At the end of two hours

will be explanated and he distant and again due town in accordant -DA AND DESCRIPTION OF VENEZUE OF STREET OF STREET TO ASSESSED. where the chor was not been also been also well as the Lot (dailed to known but of that'y and no otherwood the arm off the was 100 are of course on the Course of the State of t or then bergely for an authory . To the a sciential heavy highwaters who AND POST OF THE PROPERTY OF THE PARTY OF THE the new properties to section of the section of the sections of these toldy his off, whit formaries a of pasin manufacture. -Alon Total an Demons ; bet demonstrate sett and as settless DOTTESTABLE OFFICE OFFICE OF PARTY OF THE PARTY OF PERSONS AND PARTY OF PERSONS AND PARTY OF special names and particularly outs not only only name and stem of their last ward as no selected but in twiction of detail traspos of them as THE DESCRIPTIONS, AND ADDRESS OF THE PARTY O being her will be to be delicated by the motor of the plants being - 2400 E1 85

Stor Skiller

-un the state of the state of the state of the section of the state of

enough more mercuric oxide is added so that the mercuric oxide precipitated in the bottom gives a layer of about 15 grams in weight. Allow to remain on the steam bath one hour longer. The total is then transferred to a 500 cc. distilling flask and an excess (\$0 cc.) of syrupy 85 per cent phosphoric acid is added (to decompose any mercuric acetate formed); also add a few drops of paraffin oil to prevent frothing. The mixture is distilled until a slight frothing is noticed, and the residue is washed by distillation with 100 cc. of water dropped in from a dropping funnel just fast enough to prevent frothing. The whole distillate is then titrated with normal sodium hydroxide, using phenolphthalein as indicator.

Calculations

cc. NaOH for Total Acid - cc. NaOH for Acetic Acid = cc. NaOH for Formic Acid.

5 x cc. alkali x .06033 = % Acetic Acid sp. gr. pyro. acid

5 x cc. alkali x .04602 = % Formic Acid sp. gr. pyro. acid

THE REPORT OF THE PERSON NAMED IN COLUMN TWO ISSUES. HE

HE RESIDES THEFOR SAN TRANSPORTER AND

Wood alcohol

Measure 500 cc. of crude pyroligneous acid into a liter distilling flask placed on an asbestos gauze. Distill over 300 cc.; make the distillate strongly alkaline with

SCHOOL SECTION AND ADDRESS.

media presidente of the latest of the stage of sint is and is and as any or about is and in the president of the stage of all the stage of the stage

DELLE LA MARIE

one total stor form being one of their ster beet also a

Bin bilan " = Bilan , bilan , bilan

Arch observe : 99945, e cleste .ch e d

Lorden Dr. School

A MINE SAME AND ASSESSED FOR STREET PROPERTY AND ASSESSED AND ASSESSED ASSESSED AND ASSESSED ASSESSEDA

strong sodium hydroxide1 (35 to 40 per cent solution of commercial sodium hydroxide is satisfactory and 75 cc. is ample), and distill the neutralized distillate to a volume of 225 cc. The same flask used in the first distillation may be used for the second after simply emptying out the contents. A sand bath should be used for this distillation to permit complete hydrolysis of methyl acetate. Add to the second distillate an excess of the strong alkali used for the first distillate (10 cc. is sufficient) and distill over 65 per cent. corresponding to a volume of approximately 155 cc. A fourth distillation of 65 per cent should be made, adding about 2 cc. of concentrated sulphuric acid before making the distillation. The last distillation should be made with a well cooled condenser and 100 cc. collected in a volumetric flask. Five hundred cc. distilling flasks placed on asbestos gauze can be used for the third and fourth distillations. Glass beads or porcelain chips should be used in all distilling flasks to prevent bumping and frothing. The specific gravity of the distillate is obtained with a pycnometer at 15.56° C. and the volume should be adjusted to 100 cc. when the flask and its contents are at the temperature of 15.56°C. The per cent alcohol corresponding to a given density can be obtained from the table

The dark color produced on adding the alkali prevents the use of litmus paper and phenolphthalein cannot be used on account of the alcoholic solution.

THE RESTRICTION OF THE RESTREET WHEN PARTY WITH THE PARTY WHEN THE of any of her spotseinstein of university, and the delegance SCHOOL OF BUILDING STATE OF ST THE PERSON NAMED IN COLUMN 2 I and your understoom pleasest next to homeom with soft force or your material (Admill with 1907 June of Livery Cold Fram / waterwaters of the profession lightly in a larger than a supplemental or the second distillation on common at any other managers for After the Land Land Steer of the Call State to Series and A PARTICULAR OF THE PARTY OF TH AND NAMED OF PERSONS OF THE PARTY OF THE PAR Alme obvergion begovernesses to con a dress makes , earn LANGUAGE SHAPE STATE OF THE PART OF THE PA belowed from any other particular and the state of the state of AND OF THE PROPERTY OF THE PERSON NAMED OF TAXABLE PARTY OF THE PERSON NAMED IN THE PE the local said and the base of the name ordered to be become Affective neglect married on symmetry manufacturing the Charles BOX TO I THE TAX OF THE PARTY O -co of educations our to offeren afficulting and continues After the next of the part of the part of the part of the fundamental and of the fundamental the national to 300 per short the freeze can but with the following the national contract to the contract of t HOLE DOMESTIC THE SAN ARE LIPESURE TO WELFFRENCH MICHIGAN will all and substitute of the philosoph saving a by malescapes

the out of the real of Streets shall design the parties of the street of

of Dittmar and Fawsitt (see Van Nostrand's Chemical Annual or Smithsonian Physical Tables). Mix the distillate thoroughly after adjusting the volume and before determining the density.

Calculations

sp. gr. of final dist. x % alcohol in final dist. x 100 = 5 x sp. gr. of original pyro.

% alcohol by weight in the pyro. acid.

Acetone

add 10 cc. of 2N sodium carbonate, then add 50 cc. of N/10 iodine, counting three minutes by a stop watch and beginning to count when the pipette is one-half empty. At the end of three minutes add 10 cc. of 3N H₂SO₄. The whole is then titrated with N/10 sodium thiosulphate, using starch as indicator. The difference between 50 and the number of cc. of thiosulphate used equals the number of cc. of iodine absorbed.

Calculations

cc. iedine x .096672 x sp. gr. final dist. x 100 = 25 x 500 x sp. gr. pyro. acid

% acetone by weight in pyro. acid.

And the state of t

SHORT STATE OF

- ON A ALBERT TO A STREET AND A STREET AND ASSESSED.

.bloc .crty and all deblies or lowered

STOR LONG

The state of the s

THE THE PARTY OF

A sentence of markets in order of the first of the contract of

UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE

FOREST PRODUCTS LABORATORY



ADDRESS REPLY TO DIRECTOR AND REFER TO

> RPL Library

MADISON, WISCONSIN

May 28, 1929

Miss Emma B. Hawks, Associate Librariah, United States Department of Agriculture Library Washington, D. C.

Dear Miss Hawks:

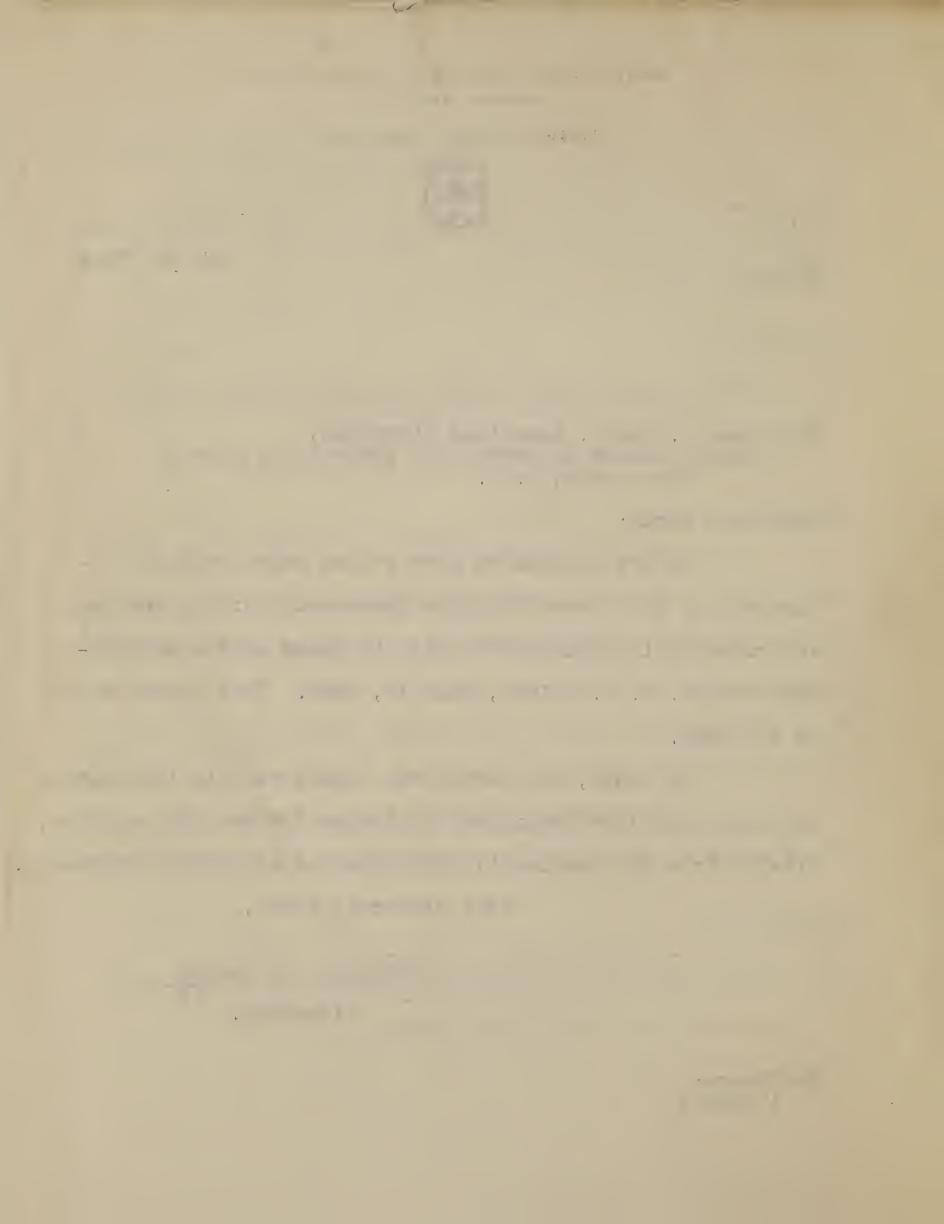
We are pleased to give you an extra copy of "Methods of the Forest Products Laboratory for the Analysis of Crude Pyroligneous Acid" which is based upon a memorandum from Mr. R. C. Palmer, June 16, 1916. This typed report is enclosed.

No doubt, the person who requested this information has also consulted Department Bulletins 129 and 508 entitled,
"Yields from the Destructive Distillation of Certain Hardwoods.

Very sincerely yours,

llen a. Hoffman Librarian.

Enclosure:
1 report



BUR. UMEM. LAD U.S.D.A. Forest service. Forest prod-1.9 Methods. for analysis of crude py-F761Mef rbligneous acid. =1927 = MAY 3 1 1929 BHA CHEROLLI مدارات ماسمد Return to cm 8 - 2432GPA



